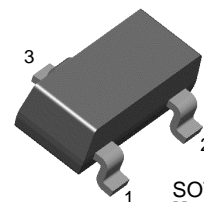


# BCW33

## NPN General Purpose Amplifier

- This device is designed for general purpose applications at collector currents to 300mA.
- Sourced from process 07.



SOT-23  
Mark: D3  
1. Base 2. Emitter 3. Collector

## Absolute Maximum Ratings \* $T_a=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	32	V
$V_{CBO}$	Collector-Base Voltage	32	V
$V_{EBO}$	Emitter-Base Voltage	5.0	V
$I_C$	Collector current (DC)	500	mA
$T_J, T_{stg}$	Operating and Storage Junction Temperature Range	-55 ~ +150	$^\circ\text{C}$

\* These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

### NOTES:

- 1) These ratings are based on a maximum junction temperature of 150 degrees C.
- 2) These are state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

## Electrical Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristics</b>						
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 2.0\text{mA}, I_B = 0$	32			V
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10\mu\text{A}, I_B = 0$	32			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_C = 10\mu\text{A}, I_C = 0$	5.0			V
$I_{CBO}$	Collector Cutoff Current	$V_{CB} = 32\text{V}, I_E = 0$ $V_{CB} = 32\text{V}, I_E = 0, T_A = 100^\circ\text{C}$			100 10	nA $\mu\text{A}$
<b>On Characteristics</b>						
$h_{FE}$	DC Current Gain	$I_C = 2.0\text{mA}, V_{CE} = 5.0\text{V}$	420		800	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$			0.25	V
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = 2.0\text{mA}, V_{CE} = 5.0\text{V}$	0.55		0.7	V
<b>Small Signal Characteristics</b>						
$f_T$	Current Gain Bandwidth Product	$I_C = 2.0\text{mA}, V_{CE} = 5.0\text{V}$ $f = 35\text{MHz}$	200			
$C_{obo}$	Output Capacitance	$V_{CB} = 10\text{V}, I_E = 0, f = 1.0\text{MHz}$			4.0	pF
NF	Noise Figure	$I_C = 0.2\text{mA}, V_{CE} = 5.0\text{V}$ $R_S = 2.0\text{k}\Omega, f = 1.0\text{kHz}$ $B_W = 200\text{Hz}$			10	dB

## Thermal Characteristics $T_a=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Max.	Units
$P_D$	Total Device Dissipation Derate above $25^\circ\text{C}$	350 2.8	mW mW/ $^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^\circ\text{C/W}$

Device mounted on FR-4PCB 40mm x 40mm x 1.5mm

# Typical Characteristics

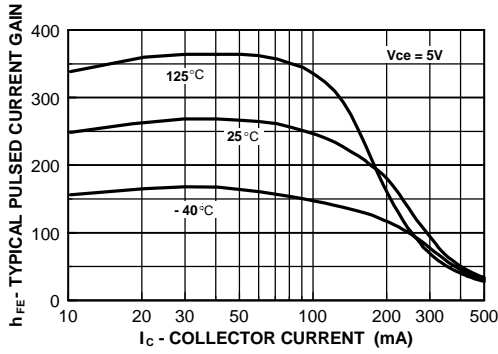


Figure 1. Typical Pulsed Current Gain vs Collector Current

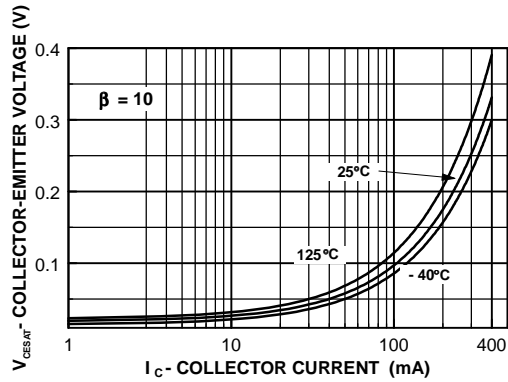


Figure 2. Collector-Emitter Saturation Voltage vs Collector Current

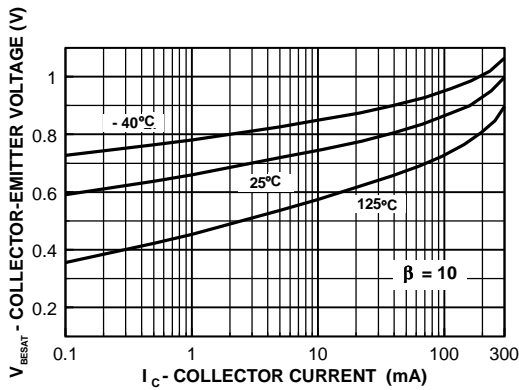


Figure 3. Base-Emitter Saturation Voltage vs Collector Current

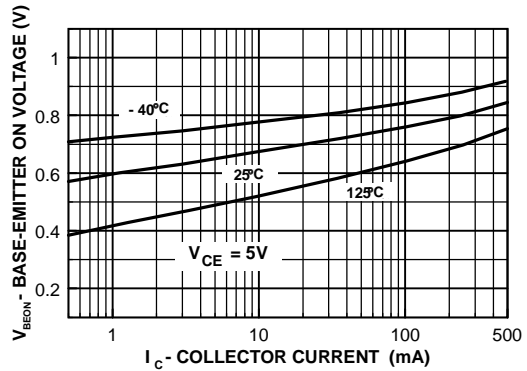


Figure 4. Base-Emitter On Voltage vs Collector Current

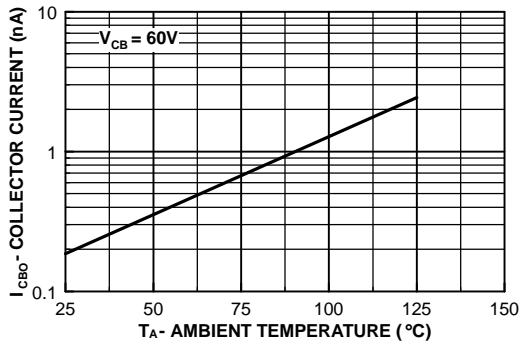


Figure 5. Collector-Cutoff Current vs Ambient Temperature

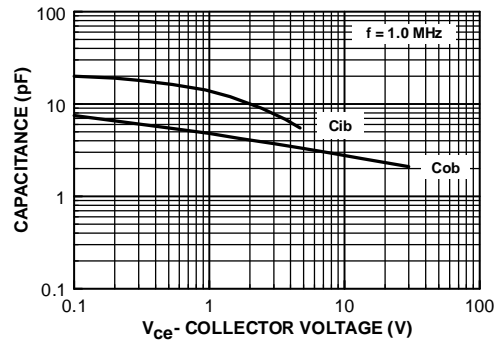


Figure 6. Input and Output Capacitance vs Reverse Voltage

Typical Characteristics (Continued)

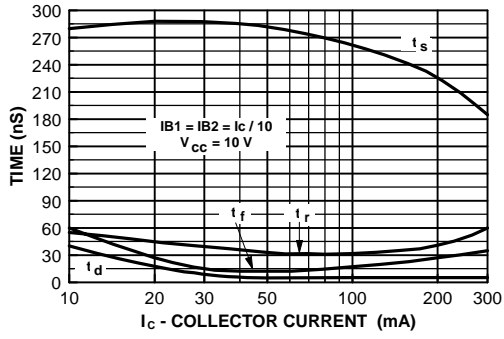


Figure 7. Switching Times vs Collector Current

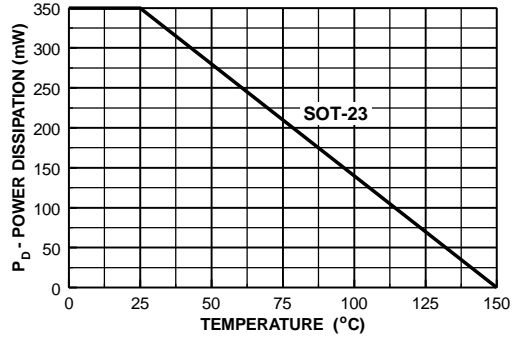
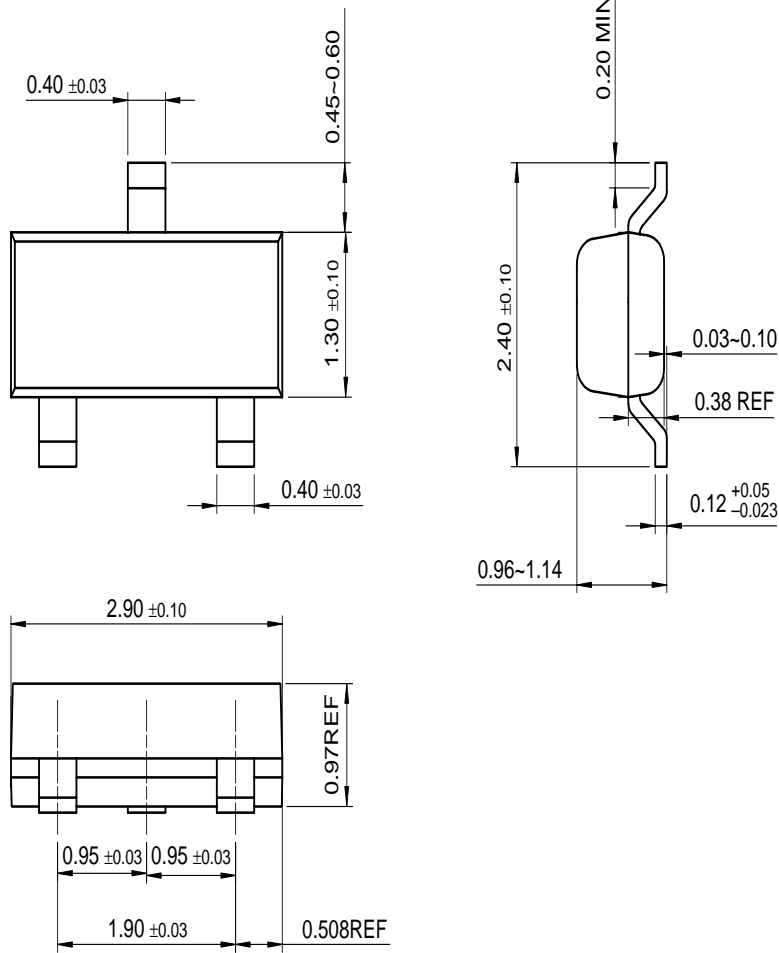


Figure 8. Power Dissipation vs Ambient Temperature

# Package Dimensions

## SOT-23



Dimensions in Millimeters

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Bottomless <sup>TM</sup>	FAST <sup>®</sup>	LittleFET <sup>TM</sup>	Power247 <sup>TM</sup>	SuperSOT <sup>TM</sup> -3
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